

Appl. No. 09/033,222

REMARKS

The FINAL Office Action of May 17, 2002 has been carefully considered. Reconsideration of this application, as amended, is respectfully requested. Claims 1-20 are pending in this application. Of these, claims 1 and 15 are independent claims. This Amendment amends Claim 1 to clarify a possible ambiguity and correct a typographical error.

1. Response to Rejection Under 35 USC 103

The Office Action, in section 2, beginning on page 2, rejects claims 1-20 under 35 USC 103(a) as being anticipated by the publication by Satoshi Konishi and Hiroyuki Fujita, entitled "A Conveyance System Using Air Flow Based on the Concept of Distributed Micro Motion Systems", published in the Journal of Microelectromechanical Systems, Volume 3., No. 2, pages 54-58, June 1994 (hereinafter referred to as "Konishi") in view of Harada et al., U.S. Patent No. 5,553,003 (hereinafter referred to as "Harada").

Discussion regarding Konishi and Harada set forth in an Amendment faxed March 8, 2002 is incorporated herein. To recapitulate, Applicants' claimed invention concerns an improved control system for moving an object on a transport assembly. Applicants' observed that cross-coupling of output between actuators may occur because of the proximity and high-density in which actuators are placed on the transport assembly. Cross-coupling may result in, for example, the output of two air jet actuators cumulatively applying a force that is different from the sum of the forces applied independently.

In accordance with the claimed invention, a plurality of control agents are organized in local neighborhoods of control agents to minimize such cross-coupling effects. Each control agent in a local neighborhood is coupled to sensors and actuators that are located physically proximate to other on the transport assembly. While Konishi concerns a microactuator array for a planar conveyance system, Harada concerns a distributed control system for power distribution. Consequently Harada in combination with Konishi fail to appreciate the problem solved by Applicants' claimed invention.

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More specifically, Konishi taken singly or in combination with Harada do not disclose or suggest a transport assembly and method of control therefor in which computational agents are grouped into a plurality of local neighborhoods, where: (a) the computational agents in each local neighborhood are coupled to sensors and actuators that are located physically proximate to each other on the transport assembly; and (b) the computational agents in each local neighborhood are communicatively coupled to each other for directly communicating their desired actuator response.

The Office Action alleges these limitations are shown in Figure 1 of Konishi, "noting that each module having an actuator, sensor, logic circuit and communication circuit may be construed as a local neighborhood, and that it is inherent that in order for such a micro motion system to work, small groups of these local neighborhoods would have to be coordinated" (page 3, lines 2-6 of the Office Action). Applicants' respectfully disagree and assert that Konishi fails to contemplate the formation of localized neighborhoods of computational agents, or in the terms of Konishi localized neighborhoods of *smart micro modules*.

More specifically, Applicants' respectfully submit that it is not inherent that small groups of local neighborhoods of actuators, sensors and logic units be coordinated in the manner described and claimed by Applicants. As set forth above, Applicants' observed that cross-coupling of output between actuators may occur because of the proximity and high-density in which actuators are placed on the transport assembly. Thus to solve this problem, Applicants organized localized neighborhoods of computational agents that share information.

A DMMS in Konishi consists of an array of *smart micro modules* that each includes a logic circuit, actuators, and sensors, as shown in Figure 1 and described on page 54, column 2, lines 17-18 of the introduction. Each of Applicants' claimed localized neighborhoods of computational agents is more than a smart micro module as described and shown in Konishi. That is, Applicants claim in addition to a smart micro module (e.g., local computational agents, sensors 203, and actuators 202 shown in Applicants' Figure 6), localized neighborhoods consisting of a plurality of computational agents, or in the terms of Konishi *localized neighborhoods consisting of a plurality of*

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smart micro modules (e.g., localized neighborhoods 620 shown in Applicants' Figure 6).

Moreover, each of the computational agents claimed by Applicants use global information from a global controller, information from computational agents in its local neighborhood, and from its coupled sensors to determine adjustments to its actuators when moving an object on the transport assembly. Thus since Konishi does not describe or suggest the formation of localized neighborhoods of smart micro modules, Konishi taken singly or in combination with Harada do not disclose or suggest the manner in which localized neighborhoods of computational agents operate as claimed by Applicants.

Specifically, Konishi taken singly or in combination with Harada fail to disclose or suggest that each computational agent uses the following information to determine adjustments to actuators in its spatially localized region of control to move an object along a transport assembly (i) the global constraints delivered by a global controller, (ii) the desired actuator responses received from the computational agents in their local neighborhood of computational agents, and (iii) the positional information from at least one sensor unit in its spatially localized region of control.

Accordingly, Applicants respectfully submit that independent claims 1 and 15 are patentably distinguishable over Konishi whether taken singly or in combination with Harada. Insofar as claims 2-14 and 16-20 are concerned, these claims depend from one of now presumably allowable amended claims 1 or 15 and are also believed to be in allowable condition.

2. Response to Double Patenting Rejection

In response to the double patenting rejection beginning on page 8 of the Office Action, Applicants incorporate the response thereto set forth in section 4 of the Amendment faxed by Applicants' on November 29, 2001.

3. Fee Authorization And Extension Of Time

No additional fee is believed to be required for this Amendment. However, the undersigned Xerox Corporation attorney hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Corporation Deposit Account No. 24-

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0025. This also constitutes a request for any needed extension of time and authorization to charge all fees therefor to Xerox Corporation Deposit Account No. 24-0025.

4. Conclusion

In view of the foregoing remarks, reconsideration of this application and allowance thereof are earnestly solicited. In the event the Examiner considers a personal contact advantageous to the disposition of this case, the Examiner is hereby requested to call Attorney for Applicant(s), Thomas Zell.

Respectfully submitted,

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Date: July 8, 2002

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APPENDIX

Marked Up Amended Claims:

This section of the Appendix sets forth a marked up version of the prior pending claim(s) with additions shown with underlining (e.g., new text) and deletions shown with a strikethrough (e.g., ~~delete text~~) under 37 C.F.R. 1.121(c)(1)(ii).

1. (Twice Amended) A transport assembly for moving an object, comprising:

sensor units and actuator units arranged ~~on~~ the transport assembly; said sensor units for providing positional information of the object; said actuator units for moving the object relative to the transport assembly;

computational agents coupled said sensor units and said actuator units; each computational agent receiving positional information from at least one sensor unit and computing a desired actuator response for at least one actuator unit in a spatially localized region of control on the transport assembly; and

a global controller, coupled to said computational agents, for receiving aggregate operating characteristics from, and delivering global constraints to, said computational agents;

wherein said computational agents are grouped into a plurality of local neighborhoods; ~~the~~a plurality of computational agents in each local neighborhood being: (a) coupled to sensors and actuators that are located physically proximate to each other on the transport assembly; and (b) communicatively coupled to each other for directly communicating their desired actuator responses to each other; and

wherein each of said computational agents uses (i) the global constraints delivered by the global controller, (ii) the desired actuator responses received from the computational agents in their local neighborhood, and (iii) the positional information from the at least one sensor unit in its spatially localized region of control, to determine adjustments to the at least one actuator unit in its spatially localized region of control to move the object along the transport assembly.